Landes and Dunes of Gascony

Collier Cobb

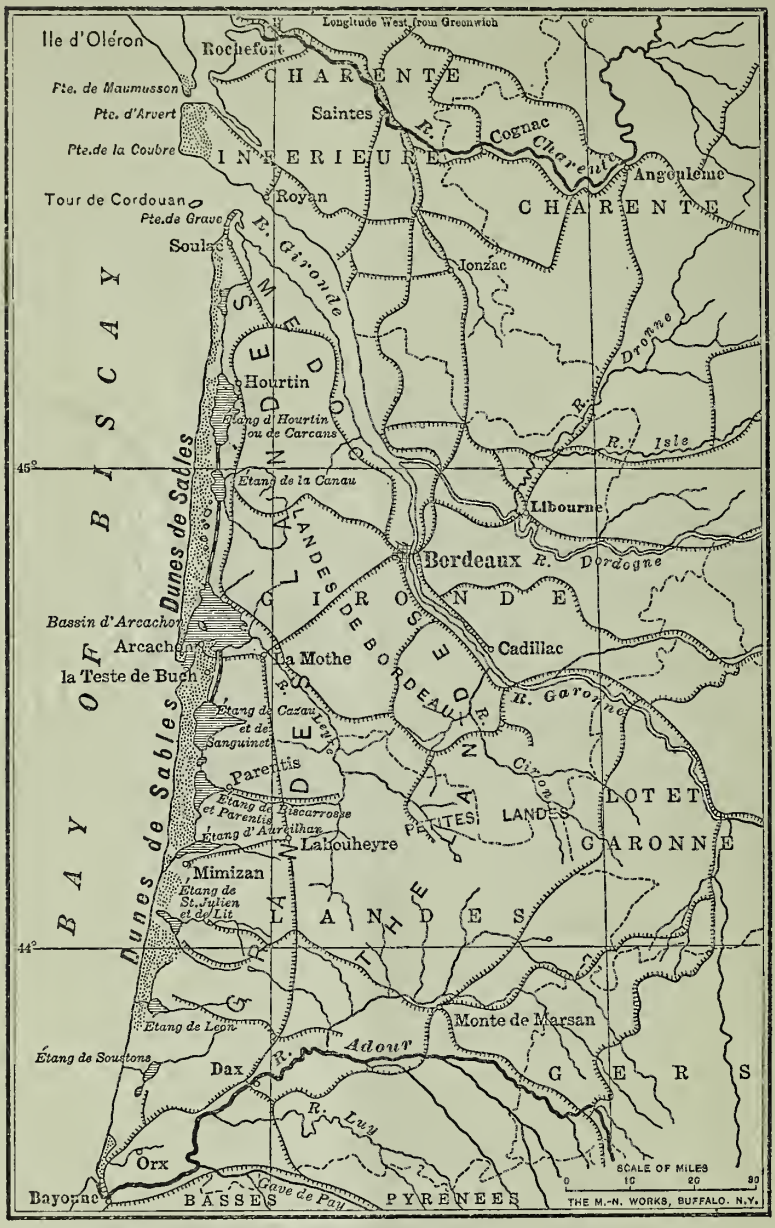
Landes and Dunes of Gascony

(With Map and Illustrations)

By Collier Cobb

THIRD PRINTING

Reprinted from the Journal of the Elisha Mitchell Society, November 1910



The Landes and Dunes of Gascony.—*Collier Cobb.*

JOURNAL

OF THE

Elisha Mitchell Scientific Society

VOL. XXVI NOVEMBER, 1910 NO. 3

THE LANDES AND DUNES OF GASCONY

BY COLLIER COBB.

Closely resembling our own Atlantic coastal plain in physiographic features, and in geological history as well, the region known in France as "Les Landes de Gascogne" posseses a peculiar fascination for the traveller who is more than a tourist, to him who would learn how man gains the mastery over nature, instead of remaining a mere creature of his environment and the slave of circumstances.

The French *Landes* extend over the department which takes its name from them, include half of La Gironde, and take in a corner of Lot-et-Garonne, occupying in all about five thousand four hundred square miles, or something less than three and one-half million acres. They are bordered on the west by a line of sand-dunes extending along the Bay of Biscay for a hundred and fifty miles, from the river Gironde to the mouth of the Adour at the base of the Pyrences. This sandy moor is thus bounded by the ocean, the Adour, the cultivated heights of Lot-et-Garonne, and the vineyards of Bordeaux lying along the Gironde.

The region is an old sea-floor, for a long time covered by the waters of the Atlantic and receiving the waste of the land, which was spread with evenness over its area. This has been lifted above sea-level to a height averaging 160 to 190 feet, declining gently on the northeast toward the Gironde and the Garonne, on the west toward the sea-shore lagoons become fresh lakes, and on the south toward the river Adour. The uniformity of this great plain is so marked that highways and railways run prevailingly in straight tangents, and from La Mothe to Labouheyre there is a stretch of the Bordeaux-Bayonne Railway without a curve, excavation, or embankment, for twenty-eight miles. The extraordinary rectilinear quality of the shore line is due, first, to the smoothness of The Landes and, second, to the mature action of a powerful sea.

The sands along the coast, and the alluvium bordering the Garonne-Gironde river, and that along the Adour as well, are classed by geologists as quaternary; though these sands, those brought down by the rivers and those washed up by the sea, show from their mineral composition that they are derived largely from the pliocene deposits that cover so large a part of the interior. Inland from this coast strip the surface is practically all pliocene, though the streams nearly all cut down to miocene and oligocene;

PLATE I.

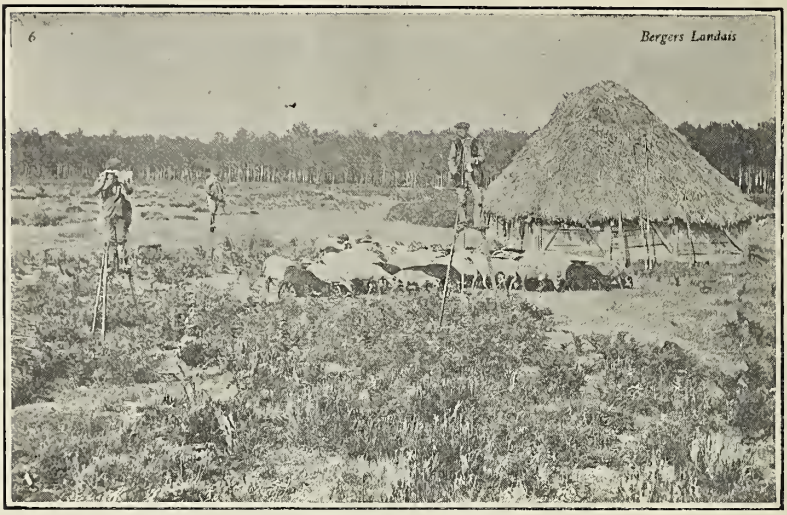


Fig. 1. A View in The Landes.

Fig. 2. An Old Shepherd With His Flock.

some of them reach eocene, which is seen along the tributaries of the Adour, and others cut down even into the cretaceous. We thus have a heavy series of stratified deposits, clay, sands, and gravels, and a calcareous marl known locally as *tufa*, this last making a bed even more impervious than the *alios*. The clean sands, greater in thickness than any other member of the series, are between the impermeable strata, are water-bearing, and may be reached by deep wells, but not every bed of sand bears water fit to be drunk.

The topographic features of The Landes may be described by calling the region a vast savanna, using the word as it is found today in popular use in the Carolinas, Georgia, and Florida. This extensive sand-flat is so poorly drained that it is nearly everywhere boggy in wet weather, though frequently dry and "crusty" in dry weather. Consequently, Schimper's definition of *savanna*, as xerophilous grass-land with isolated trees, is applicable to even the greater part of this area, since, however boggy it may be, it bears xerophilous vegetation, indicating what the ecologist terms physiological dryness. It is now well recognized by students of soils that drainage may increase the available soil-moisture. When the subsoil is too close and too fully saturated with water to permit the roots of plants to penetrate it, as is the case in The Landes, the roots are forced to develop in so limited an amount of soil, that in time of drought, when plants demand much moisture because of their rapid growth, capillary action is not able to supply the moisture from below as fast as it is needed, and the result is that the stratum of soil occupied by the roots becomes so dry that the plant growth is impeded.

The American of our own Southern Atlantic states would describe The Landes as an extensive savanna dotted over with pocosins of considerable size. The pocosins stand at a distinctly higher level than the savanna, and are forested with pines (*P. Pinaster*), though poorly drained. In the larger pocosins there are low places where the water stands in ponds in wet weather. The pocosins have little or no underbrush and are relatively free from flowering plants, while the savanna is covered with shrubs, ferns, the golden-flowered broom, and in spring and autumn is bright with flowers of various hues. When viewed from almost any point, The Landes present a dark horizon-line of pines. There is not an oak, or a beech, or a poplar, not a single broad-leafed tree of any kind to be seen on the sandy wastes.

There is also a marked absence of animal life in the region of The Landes.* There is rarely a bird to be seen, except as the sea-birds seek the shelter of the marshes and brackish lakes behind the dunes next the shore. And the quadrupeds are every bit as scarce, except for sheep tended by the shepherds and even shepherdesses. These sheep-herders stand above the moor, giants in height, but witches and warlocks for slenderness, being nearly as high as their pole-and-mud huts whose roofs are thatched with rushes. But a second look shows that these tenders of sheep are rather under-sized men and women perched upon stilts that in many cases lift them five feet from the ground.

---

* This description applies to the coastal plain portions of Mississippi and Alabama. See Hilgard, Geol. and Agr. Miss., pp. 370-371. Harper, *Torreya*, VI, 204. (Oct. 1906); Hearn and Carr, Soil Survey of Biloxi Area in Field Operations of Bureau of Soils, 1904, pp. 353-374.

Besides sheep there are some cattle and an occasional herd of marsh ponies, wild horses like the banker-ponies of the Carolina coast, whose hunting is as much a public ceremonial as the pony-pennings in the neighborhood of Beaufort. And those hunts are now as rare in Gascony as in Carolina, though one may see the little animals anywhere caught and tamed.

The marshy condition of The Landes, consequent upon imperfect drainage, is due chiefly to an impervious layer of compacted sand occurring but a short distance beneath the surface. This agglutinated sand, generally of a rusty color and bearing a close resemblance to ferruginous sandstone, is known as *alios*,† and owes its color and firmness to the continual infiltration of rainwater, which "carries into the ground various organic substances in a state of solution, and blends them intimately with arenaceous particles." (Reclus.) But in the more marshy districts the *alios* is actually sandstone, in which the cementing material is iron oxide. This bed of *alios* is generally the hardest where it is the least thick; it underlies practically the entire area of The Landes, and is completely impervious to water.

PLATE II.

Fig. 3. Shepherdesses of The Landes.

The free exit of water from The Landes to the sea is prevented by the combined action of the southward-going shore current, which forms a bar of sand running parallel with the coast from north to south, and the great sand-waves and dunes, marching inward before the prevailing westerly winds, encroaching upon Landes and swamps, and often overwhelming entire villages.

Now the region has been largely drained, and there are fewer solitudes where the Landescot must use stilts to cross the swamps and look after his flocks, this method being confined at the time of my visit, in 1908, to the

† Like the hardpan of Florida. See Harper in 3d Ann. Rep. Fla. Geol. Survey, pp. 222, 294, 295 (1911). Examined in proof.

more remote districts. We are told that before the reclamation of this vast area, "in summer it was a bed of burning sand, in winter in a state of constant inundation, while between the two was a period of pestilence. The country was characterized by sterility and insalubrity." (Gifford.)

Then the miles of almost treeless wastes, covered with low dense herbage, were sparsely inhabited: The few people who lived there, depending entirely upon their flocks, were hardly greater in number over the entire area of The Landes than at present in the few isolated districts where the population still retains its primitive character and pastoral occupation, and still speaks a romance dialect more ancient than the *langue de'oc* of much of southern France. In fact, the inhabitant of The Landes understands Italian as readily as he speaks French.

PLATE II.

Fig. 4. An Old Shepherd of The Landes.

Just as on Hatteras Island and along the Banks of the Carolina coast, there are here in the Dunes of Gascony evidences that the roving sands were centuries ago fixed by a natural forest growth. But along both coasts thoughtlessness or vandalism destroyed the forests, and the winds blew the sands inland for a time until grasses followed by woody plants bound the soil so that the winds were powerless to move it. "In the sand-dunes near Arcachon, five superposed beds of soil are to be traced, containing trunks of trees *in situ* and other remains of vegetation." (Thoulet.)

At one time the dunes threatened to destroy the entire region, for following one destruction of the forests they advanced inland at a rate varying from 60 to 80 feet a year. The village of Lege twice retired before this invasion of sand. Mimizan retreated likewise, and when measures were at length taken to stop the onward march of the dunes they were already within a few yards of its houses. (Reclus.)

There are extensive ponds and lagoons in the rear of the dunes, formerly

estuaries and bays of the sea from which they became separated by a bar of sand. The streams flowing into and seeping out of them soon leached out the salt and they became living lakes of fresh water. Some of these lakes are rapidly closing up by the growth of plants within their borders, just as Currituck Sound in North Carolina is closing up with vegetation since it became a body of fresh water through the closing of the inlets by drifting sand and the leaching action of its inflowing streams.

PLATE III.

Fig. 5. Resiners.

The largest of these lakes, the Etang de Cazau, has an area of 15,000 acres, and its surface lies at a level varying from 62 to 66 feet above the level of the sea, according to the season. This feature is very different from our own coast. The rivers draining The Landes and these lakes are turned to the southward on entering the sea, through the action of the southward-going cursand ' it tends to build across their mouths. It has several times been suggested that the government of France construct a canal running parallel with the coast, lowering the level of this and other lakes, affording a safe waterway connecting the Garonne with the Adour, and avoiding the dangers of the Bay of Biscay with its high winds and violent currents, and several such canals of small size have already been constructed.

Gascony cannot long be without such an inland waterway in a country like France, whose rivers have been regulated and deepened so as to render their currents more uniform and permanent. The natural waterways of France have been so supplemented during the last few years by an excellent system of canals that there is hardly any part of the country today that is not reached by water transportation, which has greatly facilitated the transportation of heavy and bulky products, until 42 per cent of the mineral fuel for Paris is now carried into the city by water.

The drainage of these border lakes and swamps has been effected by direct engineering efforts to a much smaller extent than is usually supposed, the most important instance of such effort being that of the Lake of Orx, near Bayonne, which was drained and reclaimed in 1864. We are also told that the efforts of engineers to remove the obstructions to the unimpeded discharge of the rivers have not generally proved successful. The result has come largely from an unforseen effect of tree planting to be adverted to later.

While it is true that the sands are ever shifting and bars are constantly forming, it is equally well recognized that the sea has been encroaching extensively upon the land. Bremontier states that the sea, in his day, wore away nearly seven feet of the beach of Hourtin annually, and the the inhabitants in this day point out traces of man on the narrow edge of this western face of the dunes or on the beach over which the dunes have moved These are essentially similar to the evidences on the New Jersey coast, consisting of alios, turf-pits, hoof-imprints, trunks of trees still bearing the marks of axes, bricks, and bits of broken pottery.

PLATE III.

Fig. 6. Une Parqueuse.

The retreat of the land along this coast is by no means due entirely to the gnawing of the sea, since there has been a marked subsidence of the land, particularly in the region to the north of the Gironde. The lighthouse of Cordouan which stands as a beacon for vessels entering this river, was erected by Louis de Foix at the close of the sixteenth century. Then the rock on which it stands was large enough to admit of several dwellings for the workmen employed in its construction. It is now completely covered at high water, and the distance between it and the Point de Grave increased from 3.1 miles in 1630 to 4.3 miles in 1876, according to Reclus, who also tells us of numerous villages, named in old chronicles, that have been swallowed up by the sea or over-

whelmed by the inward march of the dunes. "Soulac was an important town on the Gironde, below Bordeaux, whilst the English held the country, but the Gothic church and the few walls which alone remain of it now stand upon the shore of the ocean, the dunes having passed right over them." (Reclus.)

The Basin of Arcachon, about half-way between the Adour and the Gironde, is the only estuary on this coast still open to the sea. It is a large depression communicating with the ocean only by a narrow channel, and separated elsewhere by sand-dunes. The current of the Leyre, which flows into the Basin, still has sufficient force to keep a passage open to the sea. Its ever-shifting sands and violent currents are great obstacles to the conversion of this Basin into a harbor of refuge, so much needed on this dangerous coast.

PLATE IV.

Fig. 7. Oysterwoman of Arcachon.

The Basin is not completely covered, even at high water, but is traversed by various and varying channels due to the violent tidal currents which play such an important part in moulding its features. Since the planting of the shore dunes with maritime pines, this has become the chief center in France for the culture of oysters. But still the Bay of Arcachon is being rapidly filled with sediment, and recourse must be had to dredging it if its oyster beds are to be preserved, its neighboring lands saved for agriculture, and its channel kept open to the sea.

When the tide is out this Basin presents the appearance of an extensive grass-land, slightly undulating, a vast field of tempting turf. The carts drawn by oxen driven by women over the lawn lend local color to the illusion; and the beholder is ready to believe himself completely bewitched when he sees upon this lawn little schooners and other small sea-going vessels, which are really lying at anchor in the narrow channels of the Basin. The carts

are gathering the green sea-weed of the flats for manure, and the vessels are waiting for their small cargoes of rosin, turpentine, acid, oysters, shrimps, wool, wooden utensils, or even wines of the finest kinds.

The reclamation of this extensive area has been extremely slow of accomplishment, but the results obtained have paid many fold for the expenditure of time, labor, and money. In 1778, a talented engineer, Baron Charlevoix de Villers, was sent to Arcachon for the purpose of forming a military post. He saw at once the necessity of fixing the sand, and was, according to Grandjean, the first to establish the fact that the way to fix the dunes is by means of plantations of pine. He met with troubles in his work and was finally sent to the Island of Santo Domingo.

PLATE IV.

Fig. 8. Une Pecheuse de Crevettes.

In 1784, Bremontier set to work, and it is said that, by using the results of de Villers's labors, he finally succeeded in fixing the moving sand. This he accomplished by the construction of a littoral dune near the mouth of the Gironde to Bayonne the winds themselves doing the work under the control of brush fences planted by the skilled engineer.*

A protective dune was built up to the height of 33 feet, above which height it was observed that the winds did not readily drive the sand inland, provided the dune is at least 300 feet inshore from high-water mark. The windward slope of the dune is from 4 to 14 degrees, and its leeward slope about 30 degrees. This dune is kept in shape by the growth of grasses upon it, stock is carefully kept off of it, and even man is not allowed to wander at will over the dunes, lest the wind following in his footsteps set the sand in motion. The French engineers hold firmly to the opinion that the Sahara itself would soon have its oases

*For details as to the methods the reader is referred to the writings of Chambrelent, Grandjean, Poisson, Duffart, and to Dr. John Gifford, especially "The Control of Shifting Sands," in the *Engineering Magazine*, January, 1898.

PLATE V.

Fig. 9. Protective Dune.

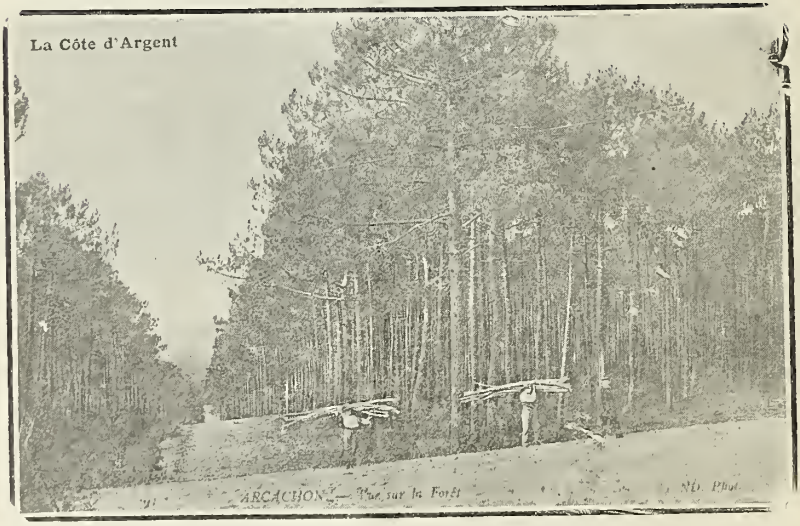


Fig. 10. Forest with Fire Line.

PLATE VI.

Fig. 11. A View on the Dunes.

Fig. 12. A View on the Dunes.

united and be largely grassed over if wandering Arabs and roaming camels could be fenced out of it.

The dunes next the shore having been fixed, it was nearly fifty years before any further effort was made to reclaim this region of marshes and "miasma." M. Chambrelent, a young engineer of bridges and roads, was sent to the Gironde to study the drainage of 8,000,000 hectares† of land in the districts of Gascony and The Landes. His plans were not accepted, but he was so thoroughly satisfied of their feasibility that he bought some land and applied to it the measures he advocated. In 1855 the results of his experiments were submitted to an international jury. "The jury was so favorably impressed that it recommended the application of Chambrelent's plans to the entire region, and in 1857 a law was passed requiring the Communes to do this work. The Communes paid for it by selling a part of this land [thus improved], which increased in value after the completion of the work."

Drain ditches were dug and seeds of the *Pinus Pinaster* were sown, all the drainage works having been completed in 1865. It was at first feared that the inability of the tap-root to penetrate the hardpan would arrest the growth of the trees, "but," says Chambrelent, "the uselessness of the tap-root has already been demonstrated.‡ It extends to inert soil which receives no atmospheric influence. It really plays only a mechanical rôle for holding the tree in place, but in close growth it is not necessary, because the trees support one another." In several cases, however, the *alios* was pierced with a pick, and wherever the tap-root gained a foothold and went through the hardpan it maintained underground drainage into the sands beneath, which already drain themselves. If organic substances have been the cementing material, the *alios* is thus permanently broken up by the drainage which the tap-root effects. Where the hardpan has become a ferruginous sandstone, the cracks in the rock have been extended by the slow growth of the tap-root; oftentimes the cementing iron oxide has been changed by contact with vegetation to an iron carbonate, which is readily dissolved out by the organic acids, and the same result is obtained by a somewhat longer process. An interesting lesson for the forest engineer.

The pines grew with great rapidity, their wood was of superior quality and soon came in great demand in England for mine props and later for telegraph poles, both props and poles being impregnated with copper sulphate before using. In speaking of the effects of the forests, Chambrient says that "The Landes, which in 1865 were pestilential, are now as free from fever as the most favored regions. The presence of so much wood enables every household to have generous supplies for heating and drying in cold and wet seasons. An investigation of the causes of agricultural depression in other parts of France only too clearly indicates the inestimable benefit of large wood supplies for domestic purposes."

This section is now one of the richest, most productive and most healthful in France, the change having been brought about by the intelligent cultivation of pine forests. In the southwest cork-oaks (*Quercus suber*) take the place of pines, reminding one of the low live-oaks that flourish, when per-

† A hectare equals 2.471 acres.

‡ Many pines on the Miami limestone of Southern Florida have roots spreading flat on top of the rock, and have no tap-root, to which fact my attention was called by Dr. Roland M. Harper.

PLATE VII.

Fig. 13. A Resiner's Home.

Fig. 14. Shucking Oysters.

PLATE VIII.

Fig. 15. Oyster Boat Manned by Women.

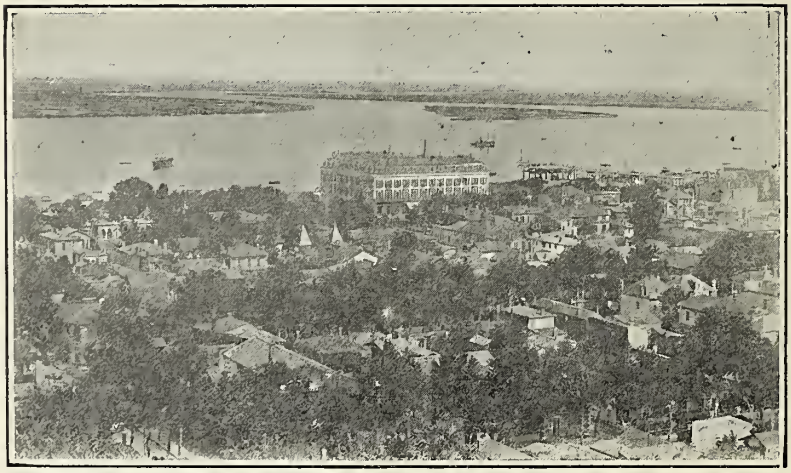


Fig. 16. View of Arcachon, France.

mitted to, on our own coast. Immense forests now cover the country, dunes and marshes are but little in evidence, and the wood, turpentine, rosin, and kindred industries have brought wonderful prosperity to the entire department, which was formerly the most barren district of Frence. "A man," says Grandjean, "was forced to take some of this land for a debt. He became a millionaire later by selling it in small parcels."

The region is now a famous health resort, combining the beauties and pleasures of the sea-shore with those of the pine forests of the sand-hills. The population of the country has increased in proportion to its natural resources. The fecundity of the people of Gascony is now as proverbial as the alarming sterility of the rest of the French people.

And the old customs are by no means completely destroyed by the coming of the health-seeker and the tourist. The native of The Landes may still be seen standing upon stilts watching his sheep. He balances himself with a staff, whose top is like the top of a crutch, and spends his spare time knitting stockings, even when gossiping with the shepherd of a neighboring flock. The country has improved and the land is no longer desolate; cordwood is cut from the pocosins and the borders of the pasture-land; but a few of the people still cling to their stilts; in fact, in several places of the back country mail-carriers use stilts today.

The women working in The Landes, the *Echassiéres,* wear skirts; but the wife of the *Résinier,* the *Parquese d'huitres,* and the *Pécheuse de crevettes,* women of the forested dunes and of the fisheries, wear trousers of various colors, though red predominates, and of picturesque patterns.

The revenue of the forests comes mainly from the rosin industry, which received a great impetus in its beginning, when similar industries in our Southern States had been disorganized or suspended on account of our Civil War and its blockade. The Hugues cup-and-gutter method of turpentining was then introduced and has been followed there with success ever since. In 1892, the United States Department of Agriculture undertook to introduce the French method into this country, and for a few years following one orchard in Bladen County, North Carolina, was treated in this way. It remained, however, for Dr. Chas. H. Herty to apply the cup-and-gutter to our American pine forests on a commercial scale and with unprecedented financial success, and today the Herty cup, which is used with a gutter specially suited to our method of scarring the trees, is as well known to foresters as the Arcachon method.

The manufacture of rosin, tar, turpentine, pitch, pyroligneous acid, wood vinegar, telegraph poles, fertilizers, etc., are by no means the only industries in this region. The raising of sheep, of cattle, and of small stocky horses, is carried on, and The Landes breed of horses is well known; bees are kept for their delicious honey; the cultivation of oysters, shrimps, and other sea-foods, is an important industry along the Bay of Arcachon; and there is some gunning around the lakes. In the industries of the interior man and wife are equal partners in work; but the business activities of the shore-line are almost entirely in the hands of women. The inhabitant of the once dune village is now a citizen of no mean city, Arcachon.

944.77 C353L P21377